LOWER BOUND ESTIMATES FOR THE EIGENVALUES OF FIRST-ORDER NONLINEAR HAMILTONIAN SYSTEMS

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Abstract. In this talk, we consider several eigenvalue problems associated with the generalized planar Hamiltonian systems on time scale

$$\begin{aligned} x^{\Delta} &= \alpha(t)x^{\sigma} + \eta\,\beta(t)\phi_p(u), \\ u^{\Delta} &= -\lambda\,\gamma(t)\phi_q(x^{\sigma}) - \alpha(t)u, \quad t \in [a,b]_{\mathbb{T}}, \end{aligned} \tag{0.1}$$

where $\mathbb{T}$ is a general time scale and $[a,b]_{\mathbb{T}} := [a,b] \cap \mathbb{T}$, η, λ are eigenvalue parameters, and

$$\phi_r(v) = |v|^{r-2}v, \quad r > 1$$

is the r-Laplacian.

Lower bound estimates for the eigenvalues are established by way of the Lyapunov inequality method. Our results are interpreted to nonlinear differential and difference planar Hamiltonian boundary value problems.

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